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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,998	09/12/2003	David J. Ecker	DIBIS-0002US.P5	7721

58057 7590 01/24/2007  
MEDLEN & CARROLL LLP  
101 HOWARD STREET  
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SAN FRANCISCO, CA 94105

EXAMINER
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CHUNDURU, SURYAPRABHA

ART UNIT	PAPER NUMBER
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1637

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/660,998

Applicant(s)

ECKER ET AL.

Examiner

Suryaprabha Chunduru

Art Unit

1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13, 15-20, 22-25 and 30-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13, 15-20, 22-25 and 30-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Applicants' response to the office action filed on November 20, 2006 has been entered.

***Status of the Application***

2. Claims 13, 15-20, 22-25, 30-45 are pending. Claim 12 is amended. All amendments and arguments have been thoroughly reviewed and deemed unpersuasive in view of amendment. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. This action is a Non-Final.

***Informalities***

3. The following informalities are noted:

(i) claim 39 recites 'said standard segment'. It would have been 'said segment'.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 39-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 recites the limitation "said standard segment" inline 1 of the claim. There is insufficient antecedent basis for this limitation in the claim because the independent claim 34, upon which the instant claim depends recite 'a segment' and thus the limitation in the instant claims 'said standard segment' lacks support. Amendment to recite 'said segment' would obviate the rejection.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 34-37, 39-40, 43-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Torroni et al. (Genetics, Vol. 144, page 1835-1850, 1996).

Torroni et al. teach a method of claim 34, of mitochondrial DNA (mtDNA) analysis comprising (a) obtaining a database comprising plurality of known bases compositions of restriction fragments produced by restriction enzymes from a segment of mtDNA from a plurality of subjects (see page 1836, col. 1, paragraph 1-2 under materials and methods section, col. 2, paragraph 1, under results section, page 1838, table 2 and Appendix A, indicating database comprising plurality of known base compositions of restriction fragments from plurality of subjects);

(b) amplifying said segment from test mtDNA obtained from a test subject to obtain a test amplification product (see page 1836, col. 1, paragraph 2 under materials and methods section, page 1846, col. 2, paragraph 1);

(c) digesting said test amplification product with said restriction enzymes to produce test restriction fragments (see page 1836, col. 1, paragraph 2 under materials and methods section);

(d) determining molecular masses of said test restriction fragments without sequencing said test restriction fragments (see page 1836, col. 2, line 1-13);

(e) calculating base compositions of said test restriction fragments from the molecular masses (see page 1839, table 2 indicating percentage frequency of base compositions of restriction fragments);

f) comparing said base compositions of said test restriction fragments with said plurality of known base compositions thereby reaching a forensic conclusion (see page 1839, table 4, page 1840 fig.1, page 1841, fig.2).

With regard to claim 35, Torroni et al. teach that the restriction enzymes include combination of RsaI, HpaII (see page 1850, legend of Appendix A, page 1836, col. 2, line 1-2).

With regard to claims 36-37, Torroni et al. teach that said subjects are humans (see page 1836, col. 1, paragraph 1 under materials and methods).

With regard to claims 39-40, Torroni et al. teach that said standard segment comprises hypervariable region (HV1 or HV2) (see page 1836, col. 1, paragraph 1 under materials and methods).

With regard to claims 43, Torroni et al. teach that said forensic conclusion comprises identification of a subject from whom said test mtDNA is obtained (see page 1846, col. 2, paragraph 1).

With regard to claim 44, Torroni et al. teach said forensic conclusion comprises tracking the geographic location of a subject from whom said test mtDNA is obtained (see page 1846, col. 2, paragraph 1).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

A. Claims 13, 15-17, 19-20, 22-25, 30-33, 41-42, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torroni et al. (Genetics, Vol. 144, page 1835-1850, 1996) in view of Aaserud et al. (Am Soc Mass spectrometry, Vol. 7, page 1266-1269, 1996).

Torroni et al. teach a method for analyzing mtDNA as discussed in section 5 above. Torroni et al. also teach with regard to claim 24-25, a correlation of mtDNA mutations with mitochondrial disease as LHON (see page 1847, line 4-41) and with regard to claim 33, plurality of test mtDNA samples (see page 1836, col. 1, paragraphs 1-2 under materials and methods section) and with regard to claim 45, length or single nucleotide polymorphism heteroplasmy (see page 1836, col. 2, line 1-14, page 1839, table 3).

However Torroni et al. did not teach determining base composition by mass spectrometry.

Aaserud et al. teach a method for accurate measurement of base composition of double-stranded DNA by mass spectrometry (see page 1266, abstract, page 1268, col. 1, paragraph 3), wherein Aaserud et al. teach that the method provides accurate molecular weights of its high-resolution mass spectrum from an electrospray ionization/Fourier transform instruments yielding only the correct ds- and ss- base compositions (see page 1266, abstract).

It would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of mtDNA analysis as taught by Torroni et al. in a manner as taught by Aaserud et al. by incorporating measuring base-composition by mass spectrometry for the purpose of enhancing sensitivity of the method for analyzing sequence variations in said target nucleic acid. One skilled in the art would have been motivated to combine the method of analyzing mtDNA as taught by Torroni et al. with a step determining base-composition measurement by using mass spectrometry as taught by Aaserud et al. because the ordinary artisan would have a reasonable expectation of success that inclusion of said limitation would result in a sensitive comparison of base composition variations in mtDNA and accurate measurement of base compositions in said target because Aaserud et al. explicitly taught that the mass spectrometry measures accurate molecular masses thereby providing correct base compositions of a target nucleic acid (see abstract on page 1266) and such modification is considered as obvious over cited prior art.

B. Claims 18 and 38 rejected under 35 U.S.C. 103(a) as being unpatentable over Torroni et al. (Genetics, Vol. 144, page 1835-1850, 1996) in view of Aaserud et al. (Am Soc Mass spectrometry, Vol. 7, page 1266-1269, 1996) as applied to claims 13, 15-17, 19-20, 22-25, 30-33, 41-42, 45 above, and further in view of Oefner et al. (US 6,453,244).

Torrioni et al. in view of Aaserud et al. teach a method of mtDNA analysis as discussed in the section 6A above.

However neither Torrioni et al. nor Aaserud et al. teach that the subjects are nonhuman eukaryotic organisms, fungi, parasites or protozoa.

Oefner et al. teach a method for detecting polymorphisms in subjects using PCR- RFLP to identify genetic variability across a population and to provide polymorphism databases for the purposes of forensic identification of an individual or for linkage analysis or population studies (see col. 5, line 6-48, col. 14, line 49-59), wherein Oefner discloses that the subjects include a number of microorganisms including bacteria, parasites and infectious agents like viruses (see col. 14, line 60-67) and analysis of mtDNA (see col. 15, line 6-13).

It would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of mtDNA analysis as taught by Torrioni et al. in a view of Aaserud et al. by incorporating various nonhuman subjects as taught by Oefner for the purpose of analyzing a wide range of populations including nonhuman subjects. One skilled in the art would have been motivated to combine the method of analyzing mtDNA as taught by Torrioni et al. in view of Aaserud et al. with the method of Oefner because the ordinary artisan would have a reasonable expectation of success that inclusion of said limitation would result in analyzing various populations including nonhuman subjects because Oefner explicitly taught that the method provides analysis of genetic diversity and association of the genetic diversity with the disease causing infectious microorganisms, which aid in prognosis of the disease and treatment of individual with the disease (see col. 14, line 60-67, col. 15, line 1-5) and such modification is considered as obvious over cited prior art.



***Response to arguments:***

7. With regard to the objection to the claims 16-19, Applicants' arguments and amendment are fully considered and the objection to the claims is withdrawn herein in view of the amendment.

8. With regard to the objection to the hyperlink in the specification, Applicants' arguments and amendment are fully considered and the objection to the specification drawn to hyperlink is withdrawn herein in view of the amendment.

9. With regard to the objection to the Drawings (Fig 20A and 20B), Applicants' arguments and amendment are fully considered and found persuasive in part. The amendment did not incorporate SEQ ID No. in the Fig. 20A and 20B, which represent sequences with more than 10 bases. Thus the objection to the drawings is maintained herein.

10. With regard to the rejection of claims 16-18, 19 under 35 USC 112 second paragraph Applicants' arguments and amendment are fully considered and the rejection to the claims is withdrawn herein in view of the amendment.

11. With regard to the rejection of claims 22-25 under 35 USC 102(b) as being anticipated by Gattermann et al. Applicants' arguments and amendment are fully considered and the rejection to the claims is withdrawn herein in view of the amendment reciting mass spectrometry, without sequencing.

12. With regard to the rejection of claim 22 under 35 USC 102(b) as being anticipated by Crespillo et al. Applicants' arguments and amendment are fully considered and the rejection to the claim is withdrawn herein in view of the amendment reciting mass spectrometry, without sequencing.

13. With regard to the rejection of claims under 35 USC 103(a) as being obvious over Gattermann et al. in view of Crespillo et al. and Aserud et al. Applicants' arguments and amendment are fully considered and the rejection to the claims is withdrawn herein in view of the amendment reciting without sequencing and new grounds of rejections.

***Conclusion***

No claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suryaprabha Chunduru whose telephone number is 571-272-0783. The examiner can normally be reached on 8.30A.M. - 4.30P.M , Mon - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Suryaprabha Chunduru  
Primary Examiner  
Art Unit 1637

  
SURYAPRABHA CHUNDURU 1/18/07  
PRIMARY EXAMINER